

DOCUMENT HANDLING

The invention relates to the handling of documents of value such as banknotes.

5       Currently, cash for dispensing machines is handled within physically secure areas e.g. at the sourcing bank when cash is being loaded into cassettes, during transport in secure vans and then in the ATM itself when the cassette is positioned in the dispenser which itself sits within a  
10       secure cabinet or safe. The emphasis is on protecting the cash by controlling it within an environment that is physically secure. This system of cash handling has evolved partly because of the lack of inherent security in the cassette itself. If stolen, it is possible to recover  
15       the cash from a cassette once removed to a convenient location, by simply smashing it open.

      There is a need to simplify the handling of currency bills or banknotes in view of the increasing use of dispensing machines and also a need to locate dispensing  
20       machines in more convenient areas rather than banks and other secure locations.

      In accordance with a first aspect of the present invention, a document handling machine comprises a non-secure or low security housing, a document store, a  
25       document transport for conveying documents of value in one or both directions between the document store and an opening, and a document degradation system separate from the store, which is responsive to an unauthorised activity in relation to the machine to degrade documents in the  
30       machine.

      The document degradation system could be located so as to degrade documents in one or more positions within the machine but is preferably located in the area or areas which contain the bulk of the documents within the machine.  
35       For example, the store may comprise a tray (in contrast to a closed cassette) on which documents are stacked, the document degradation system being adapted to degrade

documents on the tray. This is preferable since, in the case of dye degradation, the degradation can be better targeted leaving other areas of the machine "clean".

An advantage of this aspect of the invention is that the document degradation system forms part of the machine rather than the store, thus reducing the cost of the store. This should be contrasted with conventional bill degradation systems as disclosed for example in WO-A-98/03758, US-A-5156272 and WO-A-01/29786 where the documents are held in a secure store.

However, the invention is also applicable to situations where documents are stored in a closed store, such as a cassette, which can be removed from the document handling machine.

Thus, in accordance with a second aspect of the present invention, a method of providing documents for dispensing comprises providing documents in a store having a document degradation system which is activated to degrade documents in the store; and mounting the store in or on a document dispenser, the dispenser being located in an area in which the store is not protected against access by unauthorised personnel, wherein the degradation system is activated in response to an unauthorised activity in relation to the store or dispenser.

We have realised that it is possible to avoid the need to locate a document dispenser in a highly secure environment if steps are taken to deal with unauthorised access to the documents in the store or other unauthorised activities. This is achieved by incorporating a document degradation system in the store. Bill or bank note degradation systems, such as a dye spray, are known primarily for use in manually carried cases and the like, as described above, and which respond to a trigger to degrade the banknotes, for example by applying a dye to the banknotes, to a condition that renders them valueless to an unauthorised person.

Conveniently, the method further comprises conveying the store to the bill dispenser in a non-secure or low security manner. By relying on the bill degradation system to provide security, it is possible to relax the security requirements for transporting stores of documents so that they could be transported on non-secure vehicles and the like and then inserted into a bill dispenser.

Typically, the document dispenser or document handling machine is located in an area in which there is open access to members of the public. The dispenser or machine may include a lock to prevent the opportunist from stealing the store or documents while the store itself, if closed, may simply comprise a material suitable only for confinement of documents.

In theory, the documents such as banknotes still have a value to an authorised handler, because they can be returned to the issuing bank for replacement, upon presenting evidence of ownership. An unauthorised person would not have this evidence and the cash exchange would be refused, also alerting the bank or police to the theft. The notes are degraded to the point where any member of the public thinking of accepting them would refuse them on the basis that they are too defaced to use.

It will be appreciated that with this invention, it is no longer necessary to locate the document dispenser or document handling machine in a secure location, thus reducing the costs of siting the machines. At the same time it enables document dispensers or document handling machines to be located in areas such as shops and other retail outlets and in temporary locations such as within a shopping mall, say once per week on a particular day or time, at a venue where the general public are congregating, e.g. for a football match, concert etc., or in any circumstances where cash might be required by a number of people when other, permanent, machines might not be available.

In some cases, for reasons of aesthetics, the document dispenser or document handling machine may be surrounded by a non-secure cabinet such as a plastics cabinet and could, for example, be mounted within an item of furniture appropriate to the location concerned.

In both aspects, triggering of the bill degradation system can be achieved in a variety of ways. For example, the bill degradation system itself may comprise one or more sensors for detecting unauthorised access to the store. Alternatively, one or more sensors for detecting unauthorised access may be provided within the machine separately from the bill degradation system, a controller also being provided which is responsive to the sensors to activate the bill degradation system.

The invention may also or alternatively be adapted to deal with other unauthorised activities such as movement of the machine or dispenser. For example, a GPS (Global Positioning System) may be included to determine the position of the machine/ dispenser. If it is not where it should be expected, the degradation system is activated. Position monitoring could also be done remotely, with the degradation system, being remotely activated.

In another version, the machine dispenser may be fitted with sensors that detect that the machine is operating within a localised electric field, generated for example by a local short range transmitter, such that the degradation system is triggered if the whole machine is moved outside of the radiated field, irrespective of whether an attempt has been made to gain access to the documents.

The reduction in security requirements which is achieved with the invention would also enable a much lighter mechanism to be constructed since there is no need for a heavy safe to protect the currency, thus allowing the machine to be portable and the possibility of including self-powering with, for example, a battery.

In addition, communication with a remote host could be achieved in all examples using a suitable communication system such as a mobile phone or "Bluetooth" short-range radio communication.

5       The invention is applicable to document handlers more generally including dispensers, acceptors and recyclers.

Although the invention is primarily concerned with banknotes, it is equally applicable to other documents of value such as travellers cheques, vouchers, tokens of value  
10 etc.

Some examples of methods according to the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a schematic, perspective view of one  
15 example of a bill dispenser mounting;

Figure 2 illustrates the construction of a cassette;

Figure 3 is a side view of a second example of a bill dispenser mounting;

Figure 4 illustrates a bill recycler; and

20       Figure 5 illustrates the sensing system of the Figure 3 example.

In Figure 1 a bill or banknote dispenser (not shown) of conventional form is located within a housing 1 such as a shop counter formed of plastics or other relatively  
25 insecure material. A typical example of a bill dispenser is the De La Rue 1700 Single Denomination Dispenser machine. A banknote cassette is inserted into the dispenser through an opening 2 in the side of the housing 1 while a keypad 15, card reader 16 and display 14 coupled  
30 with the dispenser are mounted in the upper surface (or counter top) of the housing 1. Banknotes are dispensed through an exit opening 4.

A cassette will be loaded with banknotes in a secure location such as a bank vault and then transported,  
35 typically using a non-secure vehicle and personnel, to the bill dispenser where it will be located in the opening 2. The housing 1 is insecure in the sense that it is

relatively easy to gain access to the bill dispenser through the housing 1. However, any unauthorized attempt to gain access to the interior of the cassette will result in a banknote degradation system being activated and the banknotes being rendered useless. This will be described in more detail with reference to Figure 3 below.

Figure 2 illustrates an example of a cassette for use in the example of Figure 1. The cassette comprises a housing 20 having a retractable shutter 21 which can be secured in the closed position shown, by a lock 22. The cassette has a platform 23 on which a stack of banknotes 24 is located. The stack 24 is urged towards the shutter 21 by a pressure plate 25 and a tension spring 26. A degradation system 30 is mounted within the cassette and includes a distribution channel 31 having a sequence of apertures 32 in communication with a body 33 containing a rupturable membrane 34 storing a dye, a source of compressed gas 35 and an explosive 36. The explosive 36 is connected to a sensor 37 mounted to the cassette 20 for detecting unauthorised access. The sensor could be some form of seismic detector sensitive to vibrations exceeding a threshold, for example due to a sledgehammer attack or the like, could detect a breach in the integrity of the housing 20, for example electronically, or could be triggered remotely from a host system responsive to other sensors within the machine.

If the sensor 37 detects an unauthorised attempt to gain access to the cassette 20, it will cause a trigger signal to be supplied to the explosive 36 which will explode, causing the container 35 to rupture and thus the gas will expand into the body 33 pressurizing the flexible membrane 34 which will also rupture so delivering dye into the channel 31. The dye will then exit through the apertures 32 and irreversibly dye the banknotes in the stack 24.

This enables the cassette not only to be held in a relatively insecure housing 1 but also to be transported in a low security manner.

Figure 3 illustrates an alternative bill dispenser configuration where again the bill dispenser itself is of a relatively conventional form, in this case being mounted within a non-secure housing 10 such as plastics or thin metal sheet, the housing 10 being supported on wheels 11 so that the dispenser can be moved easily between locations. The location of the dispenser transport is shown at 12 while an open top bill support tray 60 is slidably mounted in the dispenser. The tray can be slid out of the dispenser through an opening normally closed by an access door 13. As before, a display 14, keypad 15, card reader 16 and dispense opening 17 are provided.

The tray 60 could hold more than one denomination and includes a pressure plate 25 urged by a spring 62 against the banknotes 64. Banknotes which are found not to be dispensable (typically doubles or other misfeeds) are fed to a reject pocket 66 and held securely. The bill degradation system will, of course, degrade the rejected bills as well as the non-dispensed bills.

A bill degradation system 68, similar to the system 30, is provided, the distribution channel having two connected sections 31A, 31B extending alongside the tray 60 and the reject pocket 66 respectively. The system 68 responds to a signal from one or more sensors 70 indicating unauthorised access to the housing 10 to release the dye and degrade the banknotes. The sensors 70 are shown in more detail in Figure 5 and comprise a sensor 70A, similar to the sensor 37, for sensing an unauthorised attempt to gain access to the machine; and a sensor 70B for detecting unauthorised movement of the machine e.g. being pushed on the wheels 11 away from its normal position. The sensor 70B could be a vibration sensor, a GPS sensor, an electric field sensor etc.

The sensors 70A, 70B are connected to a processor 72 which responds to the sensing of an unauthorised activity by activating the degradation system 68.

Figure 4 illustrates a bill recycler based on the De  
5 La Rue Twin Safe machine. This includes a bill input  
aperture 40 and an output aperture 41, bills supplied to  
the input aperture 40 being conveyed along a transport  
route 42 past various sensors 43 to a diverter 44.  
Accepted bills are fed down into a container 45 (which is  
10 conventionally a safe but in this example is an insecure  
container) where they are fed to a respective roll storage  
module 46 under the control of a controller 49. Each roll  
storage module 46 includes a dye degradation system 47  
similar to that shown in Figures 2 and 3. A sensor 48 is  
15 mounted on the inside of the container 45 to detect  
attempts to achieve unauthorised access, the sensor 48  
being connected to the controller 49 which, if such an  
attempt is detected, activates the dye degradation system  
47. Sensors for detecting movement could also be provided.

20 The controller 49 is also connected to a communication  
device 50 enabling information from the bill recycler to be  
transmitted by wireless means to a host 51 which may be  
situated locally or remotely. Signals can also be  
transmitted from the host to the controller 49. Such  
25 remote communication could also be provided in the other  
examples.